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| FINNEGAN, HENDERSON, FARABOW, GARRETT & DUNNER LLP 901 NEW YORK AVENUE, NW WASHINGTON, DC 20001-4413 | | | EXAMINER LAIOS, MARIA J | |
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/573,003

Applicant(s)

MERLO ET AL.

Examiner

MARIA J. LAIOS

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 June 2008.
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2 and 4-13 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 1,2 and 4-13 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☒ The drawing(s) filed on 27 June 2008 is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-8508)
Paper No(s)/Mail Date _____
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____

DETAILED ACTION

1. This office action is in response to the After Final amendment filed on 27 June 2008. Claim 2 has been amended. Claims 1, 2, and 4-13 are pending.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

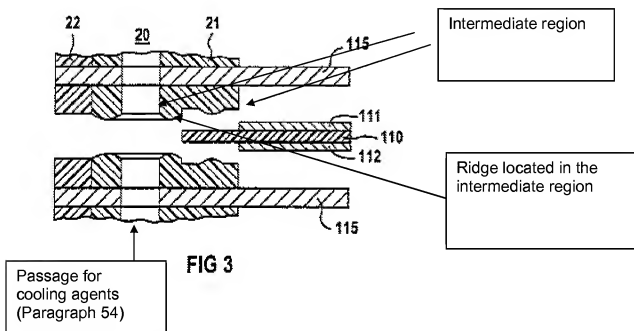
(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1 and 7-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Admitted Prior Art (Figures 1 and 2 with explanation on Page 6 line 24 through Page 7 line 23) in view of Baldauf et al (US 2003/0027031 A1)

With respect to claim 1, the applicant's admitted prior art discloses a stack comprising a plurality of fuel cells (2), a plurality of cooling devices (9) a cooling fluid (water is Page 7 line 16) and a plurality of metal bipolar plates (6) and gaskets (14,8,and 10) having passages opening for feeding a reactant gas (20a,20b) for extracting a residual gas (20c, 20d) and injecting and discharging a cooling fluid (20e, 20f) wherein each fuel cell comprises an ion exchange membrane (2) and the gasket framing the perimeter of the current collector (2h and 2g) and each cooling device comprises an electrically conductive spacer (11) and the cooling fluid flows through the cooling device (24, 25) and each fuel cell is delimited by a pair of bipolar plates (6, Figure 1) but fails to disclose the cooling fluid being separated from the ion exchange membrane.

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Baldauf et al. disclose a fuel cell stack with a gasket and a membrane. Baldauf discloses the perimeter of the membrane (110) in the intermediate region (see figure below)



It would have been obvious to one of ordinary skill in the art at the time of the invention in include the seals of Baldauf in the fuel cell system of Admitted Prior art because this would prevent the interaction of the fluids traveling through passages with the membrane.

4. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Admitted Prior Art (Figures 1 and 2 with explanation on Page 6 line 24 through Page 7 line 23) in view of Schmid et al (US 6080503) .

With respect to claim 1, the applicant's admitted prior art discloses a stack comprising a plurality of fuel cells (2), a plurality of cooling devices (9) a cooling fluid (water is Page 7

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line 16) and a plurality of metal bipolar plates (6) and gaskets (14,8,and 10) having passages opening for feeding a reactant gas (20a,20b) for extracting a residual gas (20c, 20d) and injecting and discharging a cooling fluid (20e, 20f) wherein each fuel cell comprises an ion exchange membrane (2) and the gasket framing the perimeter of the current collector (2h and 2g) and each cooling device comprises an electrically conductive spacer (11) and the cooling fluid flows through the cooling device (24, 25) and each fuel cell is delimited by a pair of bipolar plates (6, Figure 1) but fails to disclose the cooling fluid being separated from the ion exchange membrane.

Schmid et al. discloses a PEM fuel cell and discloses the openings of the membrane (5MEA figure 5a, the passageway (30) are aligned with the holes in the membrane) is larger than the passage ways (30) which allows for the bonding agent/sealing element (50) to encapsulate the edges of the membrane to prevent damage to the membrane (col. 8 lines 48-51) thus keeping the cooling fluid separated from the ion exchange membrane.

It would have been obvious to one of ordinary skill in the art at the time of the invention to replace the membrane of Admitted prior art with the membrane of Schmid because Schmid teaches the opening of the membrane larger than those of the holes that allow for the passage of fluids this prevents the damage of the membrane by allowing for the bonding agent/sealing agent to protect the membrane.

5. Claims 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Admitted Prior Art (Figures 1 and 2 with explanation on Page 6 line 24 through Page 7

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line 23) in view of Schmid et al (US 6080503) as applied to claim 1 above, and further in view of Wald et al. (US 7087339 B2).

With respect to claims 9 and 10, Applicants admitted prior art and Schmid fail to disclose the sealing element as a non conductive O-ring or gasket. Wald et al. discloses a fuel cell membrane and teaches a gasket can be made of any suitable elastomeric material including silicones, thermoplastic elastomers and elastomeric adhesives col. 6 lines 1-8).

It would have been obvious to one of ordinary skill in the art at the time of the invention to replace the adhesive sealing agent of Schmid et al. with a gasket because both are known to be effective sealants in fuel cells and Wald et al. teaches that they are recognized equivalents for the same purpose. See MPEP 2144.06.

With respect to claim 10, Wald et al. further discloses the gasket to be EPDM rubber (col. 6 lines 5).

6. Claims 11-13 rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's prior art (see applicant's specification on Page 6 line 24- Page 7 line 5), Schmid et al (US 6,080,503) and Wald et al. (US 7,087,339 B2) as applied to claim 9 above, and further in view of Barton et al. (US 6,423,439 B1).

The disclosures Applicant's admitted prior art, Schmid, and Wald et al. are discussed above and incorporated herein.

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With respect to claim 11, Applicant's admitted prior art, Schmid, and Wald et al. fail to disclose the non conductive elastomer material is in liquid form and cured by UV or thermal treatment.

With regard to claim 11, Barton et al discloses an elastomer material for a sealant material/non conductive material is flow processable/liquid at the moment of assemble and polymerized by thermal treatment (col. 3 lines 55-63). It would have been obvious to one of ordinary skill in the art at the time of the invention to replace the elastomer of Wald with the liquid polymer of Barton et al because both are known to be effective sealants in electrolytes and the Wald et al. references teaches that they are art recognized equivalents for the same purpose. See MPEP 2144.06.

With regard to claim 12 and 13, Barton et al discloses a liquid injection moldable compound for example silicones (col. 5 line 25) and from the applicants specification on page 11 "A suitable material is given by liquid silicon resins, which maintain a low hardness and a good elasticity also after completing the curing process" It would have been obvious to one of ordinary skill in the art at the time of the invention to replace the elastomer of Wald with the liquid polymer of Barton et al because both are known to be effective sealants in electrolytes and the Wald et al. references teaches that they are art recognized equivalents for the same purpose. See MPEP 2144.06.

7. Claims 4 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Admitted Prior Art (see Applicant's Specification pages 6 line 6 to page 10 line 14 and

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Figures 1 and 2) in view of Baldauf et al (US 2003/0027031 A1) as applied to claim 1 above, and further in view of Abd Elhamid et al (US 2005/0267004 A1).

With regard to claim 4, Applicant's Admitted prior art discloses the structural components as discussed above in claim 1 and incorporated herein but fails to disclose the composition of the stainless steel. Abd Elhamid et al. teaches a PEMFC in which the bipolar plates have a stainless steel composition of at least 16 percent by weight of chromium, nickel is at least 20 percent by weight and molybdenum is at least 3 percent by weight in order to provide a high bulk electrical conductivity and corrosion resistance (Paragraph 34).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use stainless steel having a composition of at least 16 percent by weight of chromium, nickel at least 20 percent by weight and molybdenum at least 3 percent by weight for the bipolar plates of the electrochemical cell stack of Admitted prior art modified by Baldauf et al. in order to provide corrosion resistance electrical conductivity as taught by Abd Elhamid et al.

With regard to claim 5, Abd Elhamid et al. further explains that the bipolar plate is a metal substrate (Paragraph 55) this metal substrate/electrically conductive element can be made of stainless steel 316L (Paragraph 38).

8. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Admitted Prior Art (see Applicant's Specification pages 6 line 6 to page 10 line 14 and Figures 1

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and 2) in view of Baldauf et al (US 2003/0027031 A1) as applied to claim 1 above, and further in view of Dickman et al (US 2003/0049502 A1)

With respect to claim 6, Admitted Prior Art discloses water as the cooling fluid but fails to disclose the circuit is closed. Dickman et al. discloses a heat exchange loop is a closed loop with deionized water in order to prevent metal ions from being introduced into the fuel cell stack (Paragraph 33).

It would have been obvious to one of ordinary skill in the art at the time of the invention to used the closed loop of deionized water of Dickman et al as the cooling fluid in Admitted Prior art modified by Baldauf because the prevents metal ions from being introduced into the fuel cell stack.

9. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Admitted Prior Art (Figures 1 and 2 with explanation on Page 6 line 24 through Page 7 line 23) in view of Baldauf et al (US 2003/0027031 A1) as applied to claim 1 above and further in view of Murphy et al (US 2003/0039729 A1).

With respect to claim 2, Applicant's admitted prior art discloses the structure of the fuel cell as discussed above and incorporated here in but fails to disclose the bipolar plate closest to the negative terminal is free of openings for fluid passages. Murphy et al. discloses an electrolyzer with a PEM (12) and bipolar plates (62) and the plate closest to the negative terminal is free of fluid passages (36) discloses a plate (14).

It would have been obvious to include a plate with no passages at one end of the stack because this allows for the inlets and outlets of the system to be located one side thus allowing for the fuel cell system to be placed against a wall.

10. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Admitted Prior Art (Figures 1 and 2 with explanation on Page 6 line 24 through Page 7 line 23) in view Schmid et al (US 6,080,503) as applied to claim 1 above and further in view of Murphy et al (US 2003/0039729 A1).

With respect to claim 2, Applicant's admitted prior art discloses the structure of the fuel cell as discussed above and incorporated here in but fails to disclose the bipolar plate closest to the negative terminal is free of openings for fluid passages. Murphy et al. discloses an electrolyzer with a PEM (12) and bipolar plates (62) and the plate closest to the negative terminal is free of fluid passages (36) discloses a plate (14).

It would have been obvious to include a plate with no passages at one end of the stack because this allows for the inlets and outlets of the system to be located one side thus allowing for the fuel cell system to be placed against a wall.

11. Claims 4 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Admitted Prior Art (see Applicant's Specification pages 6 line 6 to page 10 line 14 and Figures 1 and 2) in view of Schmid et al (US 6,080,503) as applied to claim 1 above, and further in view of Abd Elhamid et al (US 2005/0267004 A1).

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With regard to claim 4, Applicant's Admitted prior art discloses the structural components as discussed above in claim 1 and incorporated herein but fails to disclose the composition of the stainless steel. Abd Elhamid et al. teaches a PEMFC in which the bipolar plates have a stainless steel composition of at least 16 percent by weight of chromium, nickel is at least 20 percent by weight and molybdenum is at least 3 percent by weight in order to provide a high bulk electrical conductivity and corrosion resistance (Paragraph 34).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use stainless steel having a composition of at least 16 percent by weight of chromium, nickel at least 20 percent by weight and molybdenum at least 3 percent by weight for the bipolar plates of the electrochemical cell stack of Admitted prior art modified by Schmid et al in order to provide corrosion resistance electrical conductivity as taught by Abd Elhamid et al.

With regard to claim 5, Abd Elhamid et al. further explains that the bipolar plate is a metal substrate (Paragraph 55) this metal substrate/electrically conductive element can be made of stainless steel 316L (Paragraph 38).

12. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Admitted Prior Art (see Applicant's Specification pages 6 line 6 to page 10 line 14 and Figures 1 and 2) in view of Schmid et al (US 6,080,503) as applied to claim 1 above, and further in view of Dickman et al (US 2003/0049502 A1)

With respect to claim 6, Admitted Prior Art discloses water as the cooling fluid but fails to disclose the circuit is closed. Dickman et al. discloses a heat exchange loop is a closed loop with deionized water in order to prevent metal ions from being introduced into the fuel cell stack (Paragraph 33).

It would have been obvious to one of ordinary skill in the art at the time of the invention to used the closed loop of deionized water of Dickman et al as the cooling fluid in Admitted Prior art modified by Schmid et al (US 6,080,503) because the prevents metal ions from being introduced into the fuel cell stack.

Response to Arguments

13. Applicant's arguments, see page 6, filed 27 June 2008, with respect to 35 USC 112 first paragraph rejections have been fully considered and are persuasive. The rejection of 27 February 2008 has been withdrawn.

14. Applicant's arguments, see page 9-12, pertaining to the combination of Admitted prior art and Faita, filed 27 June 2008, with respect to the rejection(s) of claim(s) 1 and 2 under 35 USC 103a have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Applicant's admitted prior art which discloses the cooling device as in the claimed limitation.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MARIA J. LAIOS whose telephone number is (571)272-9808. The examiner can normally be reached on Monday - Thursday 10 am -7 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Susy Tsang-Foster can be reached on 571-272-1293. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

MJL

/PATRICK RYAN/
Supervisory Patent Examiner, Art Unit 1795